The Mining Journal

Established 1835 — Railway & Commercial Gazette

Vol. CCXXXVII No. 6071 — LONDON, DECEMBER 28, 1951 — PRICE 8d

A·N·Z

AUSTRALIA AND NEW ZEALAND BANK LIMITED

In which are merged The Bank of Australasia Limited and The Union Bank of Australia Limited.

HEAD OFFICE

71 Cornhill, E.C.3.

Telephone : AVEnue 1281.

"HUNSLET" LOCOMOTIVES STEAM & DIESEL

SPECIAL DIESELS FOR UNDERGROUND WORKING

THE HUNSLET ENGINE CO. LTD. LEEDS 10

BRITAIN'S BEST CONVEYORS by RICHARD Sutcliffe LIMITED

UNIVERSAL WORKS · HORBURY WAKEFIELD

Telephone: HORBURY 350
Telegrams: SUTCLIFFE HORBURY
LONDON OFFICE: 235 VAUXHALL BRIDGE ROAD
LONDON S.W.1 Telephone: VICTORIA 0844

Triefus INDUSTRIAL DIAMONDS

DIAMOND DRILL BITS
DIAMOND BOART
DIAMOND POWDER

TRIEFUS & CO. LTD.
32, Holborn Viaduct, London. Central 9923

LABORATORY APPARATUS

for all the sciences and for the chemical and physical examination of metals, alloys and all mining products.

Write for Catalogues M15

GRIFFIN & TATLOCK LTD.
KEMBLE STREET, LONDON, W.C.2

"RAPID" & "RAPIDITY" (ELECTRO-MAGNETIC)

ORE SEPARATORS

RAPID MAGNETTING MACHINE Co. Ltd.
Magnet Works: LOMBARD ST. BIRMINGHAM 12 (ENG.)

Magnetic Separators for every purpose

CLIMAX MINING EQUIPMENT

ROCK DRILLS

"Cornwall's contribution to Efficient Mining"

CLIMAX ROCK DRILL & ENGINEERING WORKS LTD., 4 BROAD ST. PLACE, LONDON E.C.2
WORKS: CARN BREA, REDRUTH, CORNWALL

TAS/CX527

DAVIES Model 47
MAGNETIC SEPARATOR

CONCENTRATION OF MINERALS

with Highest Efficiency and Lowest Cost

Use DAVIES

MAGNETIC SEPARATORS
CONCENTRATING TABLES
AND SCREENS

DAVIES MAGNET WORKS LTD.

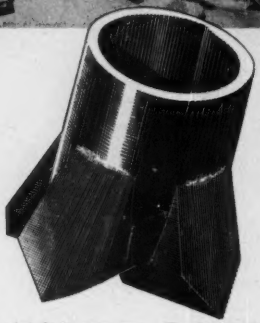
WARE · HERTFORDSHIRE · ENGLAND · PHONE · WARE 489 CABLES · DAMAG WARE

The Canadian

CRAIG

DETACHABLE BIT

Invented in Canada, where it is universally used in mines and quarries, the Craig is now Bedford-made and can be bought for sterling. Its advantages include :—



FIRM ATTACHMENT by an Archimedes Spiral. Two corresponding spirals are forged on bit socket and steel rod end. As the steel turns they engage in a powerful grip.

EASY DETACHMENT. A few sharp hammer blows and the Craig is off. It couldn't be easier.

TOUGHNESS & VERSATILITY. The Craig is suitable for all rock conditions—especially tough ones.

ECONOMY. The cost is so low that Bits can be thrown away without resharpening—so saving time and labour.

Standard Craig Bits have centre hole only but can be supplied with side hole if required.

In two size ranges for ⅞" steels or 1" steels and over

Use Bedford's Hollow Drill Steel with your Craig Bits.

Made under licence exclusively by

In action the Craig stays put. The harder the hammer twist, the tighter the lock, thanks to the Archimedes Spiral attachment.

Established 1792

JOHN BEDFORD & SONS LTD.

LION WORKS SHEFFIELD ENGLAND

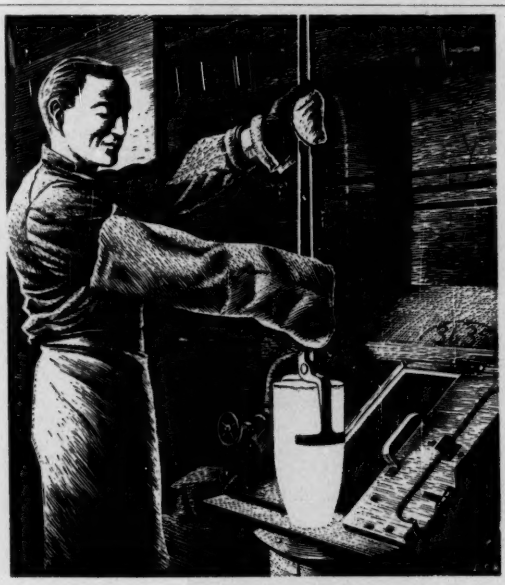
GOLD

SMELTING AND REFINING . . .

Our precious metal smelting and refining service is founded upon more than a century of experience and planned development. A gold refining capacity in excess of 400,000 oz. weekly is supported by methods of sampling and assay that assure the speedy and critically accurate assessment of the precious metal contents of any form of gold-bearing material.

SILVER AND PLATINUM

Our refineries handle also bullion, ores, concentrates and mining bye-products containing silver and the platinum metals.



J.M. & Co TRADE MARK

Johnson Matthey

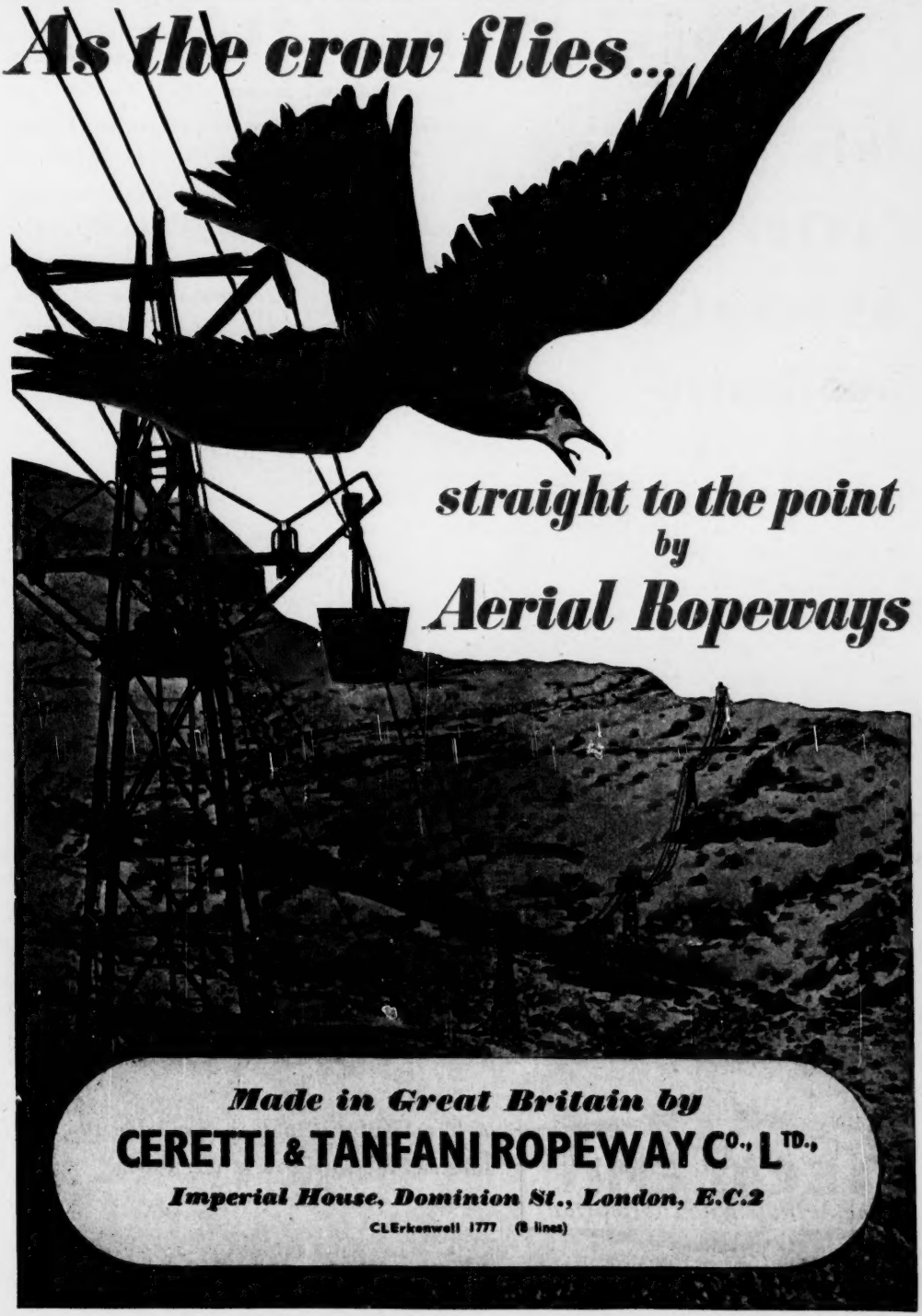
MELTERS AND ASSAYERS TO THE BANK OF ENGLAND

JOHNSON, MATTHEY & COMPANY, LIMITED
HATTON GARDEN · LONDON, E.C.1

Canada: Johnson, Matthey & Mallory Limited, 110 Industry Street, Toronto 15, Ontario
Australia: Garrett, Davidson & Matthey (Pty.) Ltd., 824 George Street, Sydney, New South Wales

GD/169

As the crow flies...



straight to the point
by
Aerial Ropeways

Made in Great Britain by
CERETTI & TANFANI ROPEWAY Co., LTD.,
Imperial House, Dominion St., London, E.C.2
CLErkenwell 1777 (8 lines)

"Work this machine faster — she's Automatically Lubricated"

Faster working! That means increased production ... greater ... much greater output. You *could* get the same results, of course, by working longer hours — but that puts up your costs. No, the solution is to install Tecalemit Centralised Lubrication — fully automatic, semi-automatic or manually operated — which feeds to every bearing the correct amount of oil or grease at the correct intervals of time. Machines can then be worked faster with complete safety; no overheating ... no breakdowns due to faulty lubrication...just smooth, untroubled running!

TECALEMIT
The Authority on Lubrication
PLYMOUTH & BRENTFORD

A Tecalemit Engineer is available to 'talk lubrication' with you at any time.

T325

The Mining Journal
Established 1835

Vol. CCXXXVII No. 6071 LONDON, DECEMBER 28, 1951 Price 8d.

CONTENTS

Notes and Comments 663
From Our Indian Correspondent 664
Management Practices in U.S. Coal Industry 665
Exploration and Development in Swaziland 666
Reviews 667
Raw Materials for the Mineral-Wool Industry 668
Machinery & Equipment 670
New Holman Forging Hammer; British Standard for Rubber Conveyor and Elevator Belting Revised; South African Order for David Brown & Sons; The Hunslet Engine Company in 1951; Concreting and Related Operations at the Kelley Shaft, Butte, Montana.
Company News and Views 671
Rand Dividend Season Closes; Géomines Turns to Lode Mining.
Company Shorts 671
Company Meetings and Announcements 672
Klerksdorp Consolidated Goldfields; Anglo American Corporation of South Africa Ltd.; Anglo American Corporation Group of Companies.

Published by The Mining Journal Ltd. at 15, George Street, London E.C.4. *Subscription £2 per annum (post free)*

NOTES AND COMMENTS

U.S. Tin Buying Policy Approaching a Showdown?

If the object of the U.S. administrators is to keep tin producers on the string they appear to be succeeding admirably, but U.S. consumers are now getting alarmed; they want to know what their supplies are to be and when they will get them. Tin platers are the major consumers in the U.S., accounting to-day for some 50 per cent of the total tin used. The metal administrators can either resume buying or release metal from the national stockpile; probably the consumer does not mind which so long as the tin is forthcoming. Tin plate makers cannot get out their 1952 price lists, partly because of the steel wage issues, and partly because of the uncertainty of tin prices and owing to the long time required to manufacture and distribute plate to the can makers they need to know well in advance how they stand. In years gone by the U.S. Steel was generally understood to carry at least six months' supply of tin as a matter of normal policy. To-day, the tinplate trade is even more apprehensive about the second quarter position than they are over the immediate situation. At a meeting of the N.P.A. officials and the tinplate interests last week the officials are reported to have been unable to reassure the trade that there would not be "an acute tin shortage," and, off the record, to have admitted that unless the R.F.C. resume purchases from foreign sources, the second quarter situation would be extremely critical.

The U.S. tin mission to the Far East left Singapore for home about the middle of last week. After returning from what is described as "a hush-hush" visit to Indonesia where according to a Singapore report they tried unsuccessfully to buy tin but only got evasive answers from the Indonesian authorities. The Federal member for economic affairs in Kuala Lumpur has stated that the question of a fair price for tin was not within the terms of the reference of the tin mission and it will no doubt be remembered that the head of the mission, General Wilson, is reported, in conversations, to have stood pat on Mr. Symington's earlier ultimatum. That any tin shortage in the U.S. is artificial and due entirely to the determination of leading officials like Mr. Symington and Mr. Fleischmann to "bear" tin prices is obvious and it could be immediately relieved by a stroke of the pen. The U.S. Government has shown signs of a retreat as regards ceiling prices in some of the major metals and it is impossible to accept seriously the argument put forward that the extra cost of a more realistic tin policy would break the credit of the U.S. Government. Mr. Truman's administration has been making heavy weather of late over the tax scandals and with the Presidential election now in sight they may find it inexpedient to provoke the antagonism of the U.S. Steel and other important branches of the consuming trades, so it would seem probable that some definite decision to make more tin available will be forthcoming ere long, though whether this will be by way of trenching on the stockpile or resuming purchases at such a level as an open market may decide is another matter. Possibly the issue may come under consideration when Mr. Churchill visits President Truman at the beginning of next month.

Queensland Mines in 1950

A detailed review of the fortunes of the mining industry in Queensland last year is given in the annual report of the Under Secretary for Mines which though dated in the middle of May has only just reached us. While the total value of the mineral production increased largely owing to market advances—from £A.11,976,837 to £16,453,060—there was no great improvement in the mineral and metal output. Of last year's total output gold represented £A.1,367,124, and other mine products, including coal, £A.15,085,936: the chief items being lead £5,032,679, zinc £3,757,368, coal £3,562,541, silver £981,973 and copper £962,307.

Thanks principally to Mount Morgan the total gold output of the state was 88,249 f.oz. an increase of 11,967 f.oz. and was the highest since 1942. Of the total, Mount Morgan gave 75,361 f.oz.; but other producers were unimportant, Golden Plateau being second with 4,164 f.oz. and Black Jack third with 2,178 f.oz. Mount Morgan mined 2,314,443 tons of ground of which 1,507,025 was overburdened, and though the total tonnage treated at the mills was lower for the year the average both of gold and copper was higher. The smelter which was shut down for about two months at the turn of the year treated 814,505

tons of sulphide ore averaging 2·70 dwt. gold and 0.66 per cent copper, producing besides gold 16,494 oz. silver and 4,696 tons of blister copper.

Fair progress was made with the erection of the Mount Isa Copper Mill and Smelter but material supplies have been slow and it is not anticipated that the new plant will be in operation before the end of 1952. Meanwhile Australia has largely to import her copper requirements.

The Queensland lead output improved from 37,697 tons to 39,173 tons; that of zinc from 212,241 tons to 25,800 tons and of silver from 2,872,577 to 2,940,641 oz. almost entirely from the Mount Isa smelter. Total value of the company's output was £A.9,855,482. The report of the company's last book year was published in last week's issue. Exploratory work by some major mining groups was active throughout the year but without any substantial success and the Broken Hill South appears to have abandoned exploration at any rate for the present.

Coal output at 2,320,798 tons was a record notwithstanding which coke had to be imported.

Production of tin concentrates showed a considerable drop during the year despite the rising prices, the total was 857 tons compared with 1,051 tons in the previous year. The decline was chiefly due to lower output from the Tableland Tin which yielded 497 tons. Prospecting operations down river necessitated by the limited life of the property revealed no payable ground and since then sludge difficulties have threatened Government interference. The present life of the company may not be more than about a year.

Mining of beach sands minerals was actively pursued and the output of the year 14,710 tons, valued at £A.250,000 as against an output of 11,061 tons in 1949. The alloy metals, production of which has so long been associated with Queensland, failed to show much progress despite the rising prices. Production of wolfram concentrates was 38 tons, of scheelite 3 cwt., and of molybdenite 4½ tons

Oil prospecting proved disappointing. The wildcat being drilled by the Shell on Morella Holding struck unfavourable rock structure at a depth of 4,634 ft., and all drilling ceased. The associated companies operating at Roma carried on a programme of geological and geophysical work to ascertain whether further drilling should be undertaken, and where. There was no production.

Netherlands to Strengthen Raw Material Position

The Netherlands Ministry of Economic Affairs is organizing intensive research into the possibility of mining and processing the country's non-bituminous minerals with a view to the exploration of anhydrite for the production of sulphuric acid and cement. At present, sulphuric acid—for which industrial demand of industry is considerable—is made from pyrite, which has to be imported. Research having shown that both sulphuric acid and cement can be produced from anhydrite, which is found in Holland, the Minister of Economic Affairs has recently proposed a plan of geological exploration, intended to obtain precise data on the quality and quantity of the anhydrite available in the country and on the depth at which it is found. Commercial exploration is to follow if these data prove to be favourable. Dutch banks and industrial concerns are ready to provide an amount of 500,000 guilders on the understanding that the Ministry of Economic Affairs provides a similar sum, to cover the research costs, estimated at 1,000,000 guilders.

As the Markets were closed over the Christmas holiday, our two regular features—Metals, Minerals and Alloys, and Mining Markets—are not appearing this week. They will be resumed in our next issue.

India

(From Our Own Correspondent)

Colombo, December 4

The value of the annual production of minerals in India is now estimated roughly at Rs. 750,000,000 according to Dr. M. S. Krishnan, Director of the Geological Survey of India, Dr. Krishnan says that there are reasons for believing that this is an undervaluation.

The Geological Mining & Metallurgical Society of India, while welcoming the move taken by the Government of India in drafting rules for the proper and efficient development of economic mineral deposits of the country, maintained that the rules appeared to be rather elaborate, complicated and contradictory. It suggested the creation of a council of officials and non-officials with mandatory powers and with which must rest the final decision in regard to mine prospecting and development work. The Government of India, it stated, should bring all matters relating to mining and minerals permanently under the Central Government without relegating any administrative power to the State Governments.

Proposals for starting a large-scale aluminium industry in Madras State are under the consideration of the Government. The Government are studying the question of economic utilization of the rich deposits of bauxite available in the State, said Mr. M. Sitarama Reddy, Minister for Revenue. There were, he said, great possibilities for industrial development in Madras State, particularly in the field of metals. It had been found that Salem and Sandur had rich deposits of iron ore, which had been tested and said to be of a high quality. There were also deposits of lignite.

RADIO-ACTIVE MINERALS CLAIM

Uranium and a few other radio-active minerals are claimed to have been discovered by a Bengali miner in Bihar, Mr. Ghose, who is now in communication with the Atomic Energy Commission of the Government of India on the question of how this discovery can be used profitably on a commercial scale. According to Mr. Ghose, the first physical examination of a sample showed the mineral contained 0.406 per cent of uranium oxide which should have entitled him to a reward of Rs. 10,000 from the Government of India, but a later examination of the sample placed the uranium oxide contents at only 0.12 per cent.

In accordance with the recommendations of the Planning Commission of India, a target of about Rs. 10,000,000 has been established for a five-year development programme of the Geological Survey of India, which is staffed by 176 officers, whose work is mostly confined to field survey. However, during the five-year period, the Survey's staff will be increased to 275 geologists. Furthermore, the Survey is now engaged in the preparation of a geological map of India on which all future geological activities will be based.

The Director of the Geological Survey, Dr. M. S. Krishnan, said that investigations and geophysical explorations on ground water and a survey of strategic minerals, such as chromium, sulphur and manganese, would be conducted during the six-months field season which has just started. One field party would explore the possibilities of sulphur in Bihar and Shahabad; a team of mining engineers would look for deposits of ferrous metals, the Kurnool district (Madras State), which claims to possess rich lead deposits, would be surveyed, and the investigation of Cutch lignite deposits would be continued.

Prospecting for petroleum in some areas in the Himalayas, particularly in the Punjab region, and in the plain of Bengal, is also in progress. Structural investigation of rocks for the same purpose are being carried out in Saurashtra and the Gulf of Cambay.

AMERICAN COAL MINING INDUSTRY—I

Management Practices in U.S. Coal Industry

The productivity team from the British coal mining industry which visited America earlier this year has now issued its report. Entitled *Coal* and published by the Anglo-American Council on Productivity, 21 Tothill Street, London, S.W.1, the 107 page report is priced at 3s. 6d., post free. Although the team was covering familiar ground the report as a working document loses none of its value. For it offers the British coal mining industry several sound recommendations which, if adopted in this country, would affect the very basis of the present system of administration. In the article below, based on the report, some of the salient points of American mine management are described and reference is made to the U.S. day wage system. Subsequent articles will deal with production, transportation and the future of the American coal industry.

Superior geological conditions and the almost inexhaustible coal reserves of the United States give the American coal mining industry a character very different from the British industry thereby rendering the wholesale importation of American machines and methods into this country impractical. The team accepted these features as basic data and concluded that because of these natural differences output per head in this country could not hope to equal that of the United States. But if the team did not find in America any simple practical solution to this country's output problems it did feel that there were long term advantages to be gained from a close study of American management practices and methods. Particularly so, if by their introduction into the British coal mining industry there would be injected an attitude of mind towards work similar to that prevailing in the United States. In fact, the team attributed a large measure of the success of the U.S. coal mining industry to the belief shared by management and miners alike that their respective ends were best served by increased productivity at lower cost and to the clear recognition by both sides of their respective roles.

METHODS AND PRACTICES OF AMERICAN MINE MANAGEMENT

The general effectiveness of American mine management favourably impressed the team, not in the sense of its structural organization nor in the allocation of functions, which have their British counterparts, but by the successful manner in which U.S. management was welded into a team to blend harmoniously with the operational staff at all points of contact. American mine management accepts the idea that modern mining is too complicated a business for one type of person to master in all its details and requires specialist help; that administration is a matter of people and thus in the selection of its officials it attaches great importance to personal qualities, and, that the criterion which matters most is the final result achieved.

To breathe life into these three ideas service departments are developed in response to the operational staffs themselves. This important aspect of the American system is well illustrated in the Report where the part played by an accountant is given as an example. He is not considered as merely a recorder of events, standing aside from the main stream of events and continually faced with the difficulty of making his point of view acceptable to people who have already gone far towards making up their minds. He is one of a team and shares from the outset, at all levels down to and often including the section, in the making and implementing of plans. Production officials encourage him to experiment with new methods of collecting, presenting and simplifying the data by which they control operations. Modifications of mining methods have been traced to an accountant's analysis of cost. The accountant for his part recognizes that his job is to serve those in charge of operations, to give them information in the form in which they need it, showing clearly in simple significant terms what action has to be taken and where—and early enough to be taken effectively. He is at pains to avoid professional jargon and to learn and use the language of his clients. He meets his client on his client's job. Thus it is not uncommon for cost clerks to discuss with foremen in their sections underground how particular practices and proposals will affect the finances of the company. This attitude appeared to be common to all service departments which were a real and vital part of the team, and it was made possible by the fact that many of those employed in the service departments came from the operational side and may go back to it. This striking example of mobility of labour is due to exchanges between branches being easy and frequent. With this attitude of mind it is not difficult to understand how important for the efficient welding of management into a team it is that administration be carried out on a personal basis. Thus collaboration on the job and not between offices is the general rule. This feature has the additional advantage in that since the bulk of the day-to-day business is carried on by word of mouth, concern over individual status does not become a problem.

Recognizing that personal qualities of the officials are as important as their technical qualifications, especially as the operational side is broken down into small team, U.S. mine management pays particular attention to the selection and training of its officials. This point is taken up by the team which recommends that the British coal industry give close attention to the systematic training of its management to make use of modern techniques and aids, and to function as a team and suggests that the British industry should work towards the creation of a grade comparable in stature with the American section foreman.

THE SECTION FOREMAN

The position of the section foreman is different from that of any recognizable British official working underground. He is a salaried official, a part of the management, a non-union member and, without exception, receives a higher salary than any of those under his control. He must hold a statutory certificate and in mechanized mining he is in charge of a self contained team varying in size from 10 to 30 men comprised of cutters, drillers, loaders, shot firers and shuttle car drivers.

Except at pits where hand filling takes place, all American miners are paid on the day wage system. Under this system of wage payments productivity depends on the time the machines are at work during the shift. The first duty of the section foreman is to think ahead and to plan the work of the crew so that the machines operate with the minimum amount of interruption. He must see that all equipment is properly maintained and that materials are available at the right time and place. Great stress is laid on his ability to prevent and to anticipate trouble rather than on his skill in repairing the machines or correcting errors after they occur. Indeed, the general superintendent of a company in the process of changing over to mechanized mining considered that the most important part of it to be the training of its officials to think two or three days ahead.

COLONIAL MINERAL DEVELOPMENT—II

Exploration and Development in Swaziland

In last week's issue of *The Mining Journal* appeared an article on the mineral resources of Bechuanaland—the first in a series of articles on the mineral resources of the smaller and perhaps lesser known British overseas territories, their exploration and exploitation, and future potentialities. The following article is devoted to the mineral wealth of Bechuanaland's neighbour, Swaziland, and further articles in this series will be published during the next few months.

Since 1881, when gold was discovered on the slopes of the Drakensberg Mountains, the mineral resources of Swaziland have attracted the attention of prospectors. In 1950, this territory produced chrysotile, asbestos, cassiterite and barytes, valued at £1,713,928. Many promising discoveries have been made from time to time, but with the notable exception of asbestos, the results of development did not, as a general rule, come fully up to the considerable expectations which were periodically aroused. It is believed, however, that Swaziland's undoubted mineral wealth warrants systematic investigation and that future years may witness important developments in the mining history of this territory.

In May, 1942, a preliminary geological survey was started by the present director of the Geological Survey of Swaziland, Dr. H. J. R. Way. Under the Colonial Development and Welfare Act, grants totalling £84,004 have been made available for a scheme covering the period 1948-1956. Under Dr. Way there are now three geologists recruited from the Union of South Africa and a drilling superintendent. The appointment of a Mineral Development Officer, qualified in mining engineering, has been approved, and will provide for the efficient cntrol of prospecting and mining. The Government also has under consideration the appointment of a European prospector to undertake preliminary investigations and excavation of mineral deposits discovered on Crown areas, particularly those overlapped by Native Reserves, which are not open to public prospecting. Much information of a highly encouraging nature has already resulted from the expanded activities of the Survey.

One of the three High Commission Territories, Swaziland occupies an area of 6,704 sq. miles. It is bounded on the north, west and south by the Transvaal Province and on the east by Portuguese territory and Zululand. The present form of administration was established in 1907.

SCRAMBLE FOR CONCESSIONS

Considerable difficulties have been caused by the scramble for concessions which took place nearly seventy years ago, when Mbandini, King of the Swazis, distributed land and mineral rights wholesale, subject to the payment of royalties and a profit tax. Within a few years at least forty concessions were granted, most of them for a cash payment and rentals of up to £300 a month. By 1890, the position had become so chaotic that a commission had to be appointed to clear up the mess. It reported in 1906 and a large number of concessions were accordingly expropriated under the powers vested in the Governor by a proclamation of 1904. The Crown thus acquired the ownership of several mineral areas, which became open for prospecting. There were numerous concessions, however, which in view of the commission's findings were allowed to stand. In such cases mineral rights were not subject to Government control and all rights remained matters for agreement with the concessionaires.

Under the Mineral Concession Areas Proclamation of 1927, concessionaires were given the choice of (1) carrying on development themselves; (2) paying a tax of 5s. per 100 morgen (a morgen is 10,000 sq. yd.), deducting any sum payable in rental; or (3) throwing open their property to prospecting. If they failed to pay the tax they could be sued and the concession could be transferred to the Government by an order of Court. The area under class (1) amounts to about 1,600 sq. miles and that under class (3) to about 2,000 sq. miles. The Swaziland Corporation (1924) has mineral rights over 7,380 acres and surface rights over 39,745 acres.

In assessing the mineral potentialities of Swaziland considerable difficulty was experienced initially by Dr. Way in determining the ownership of the mineral rights, which are definitely separated from land rights, and much time had to be spent on the study and interpretation of the concession diagrams.

In the days of Mbandini, when concessions were to be had for the asking, a considerable amount of capital was invested in a fifty-mile strike of quartz and schist gold-impregnated outcrops, which was regarded as a coming *Eldorado*. Several lodes were opened up and in some instances preliminary results encouraged the extravagant hopes which were freely entertained. The Forbes Gold Mining Co., for example, averaged a yield of about 800 oz. a month. Unfortunately, gold mining was not carried out on scientific lines and in the early days, cost of transport from the coast, amounted to as much as £30 a ton. During the latter years of the First World War, practically all the mines had to close down.

GOLD PRODUCTION

From 1910 to 1915, total production of gold amounted to 61,969 oz., valued at £263,235. From 1916 onwards, however, mining was mainly confined to a spasmodic renewal of operations here and there, until the abandonment of the gold standard at the end of 1932 led to a revival of interest in the territory. Several companies and syndicates were formed to operate abandoned properties and one or two production plants were erected. This small-scale boom reached its climax in 1937, when 2,410 oz. of fine gold, worth £16,873 were recovered. The following year, however, output was less than half that quantity. There was no gold mining during the war years, but in 1945 3,593 oz. of gold, worth £28,666, were produced. Output reached 5,637 oz. in 1947, but has since declined and was only 1,793 oz. in 1950.

IMPORTANT ASBESTOS MINE

For the past twelve years Swaziland's largest mineral producer has been the Havelock Asbestos mine, owned by Turner & Newall, which started production in June, 1939. No less than £750,000 was expended in bringing this proposition to the producing stage. The most spectacular part of the equipment is an aerial ropeway more than 12¼ miles long. The mine is worked to a certain depth by quarrying, this work entailing the removal of 4,000,000 tons of wall, rock and overburden. The plant is capable of producing more than 2,000 tons of bagged asbestos monthly. In 1950, production of asbestos in Swaziland amounted to 29,167 tons.

There is a small amount of mining for alluvial tin in the vicinity of Mbabane. The Swaziland tinfields were prospected and favourably reported on as far back as 1889, and

the pioneer companies started operating before the present century began. Alluvial deposits in the river beds, as well as terrace deposits in adjoining streams, are treated by monitors and sluice boxes. Between 1906 and 1926, 6,785 tons of tin valued at £1,065,000, were recovered. From 1933 to 1938, the annual value of tin produced varied from £33,129 to £27,356. The war gave a considerable impetus to tin mining in Swaziland, as elsewhere, but only 37 l.tons of metal were produced in 1950, compared with 130 tons in 1941. Another mineral in current production is barytes, of which extensive reserves exist. An output of 434 l.tons was reported for 1950.

OTHER MINERALS

Many other minerals are known to exist in Swaziland. In the course of working various gold mines, large deposits of excellent haematite were discovered. A scheelite deposit at Forbes Reef was examined during the preliminary geological survey carried out by Dr. Way. Considerable attention has also been devoted to the corundum deposits of Southern Swaziland, some of which were worked during the war. Extensive coal measures may present opportunities for profitable exploitation and a calcite deposit at Nsalitshe may be commercially valuable. Among the mineral possibilities at present being actively prospected by private persons, Public and by the Survey, are proved deposits of barytes, coal, diaspore and haematite, as well as further occurrences of asbestos (chrysotile and tremolite), calcite, columbite, euxenite, fluorspar, galena, gold, kaolin, monazite and pyrophyllite.

Whereas all cassiterite mined so far has been from alluvial sources, recent detailed investigation of cassiterite-bearing pegmatites in the vicinity of Mbabane revealed an estimated tonnage of 50,000 running at 0.34 per cent metallic tin. It is possible that, at the present price of tin, these pegmatites might be exploitable as lode mining propositions.

DIAMOND DRILLING STARTED

Diamond drilling was started in October, 1950, in a programme of investigation of the Londosi barytes deposit on Crown Mineral Area No. 7, Mbabane District, in order to substantiate prospective reserves estimated on geological reasoning at 1,000,000 tons. Three boreholes have been completed and a fourth is in progress, giving a total footage of 2,110 ft. It is expected that a fifth borehole would complete the programme before the end of 1951. So far, the results have come up to the previous figures.

The programme for 1952 includes preliminary investigations of a galena prospect in the Hlatikuku district and manganiferous iron ores in the Mankaiana district as well as diamond-drilling of the cassiterite-bearing pegmatites near Mbabane and of a diaspore deposit in the Mankaiana District.

GEOLOGICAL MAPPING

Satisfactory progress is being made in the geological mapping of Swaziland. Up to the end of June, 1951, the area mapped reached the figure of 1,939 sq. miles, which is 29 per cent of the total area of the territory. At the present rate, mapping should take another 7½ years to complete on the scale of about 1 : 25,000 with the assistance of aerial photographs. It is anticipated that the rate of progress will be accelerated when 1 : 50,000 topographical sheets become available from the Colonial Topographic Survey.

Recent mapping of the Swaziland System and Older Granite of the south-west portion of the Mbabane district has resulted in considerable advances in the knowledge of this important mineralized complex of igneous and metamorphic rocks. Information obtained from this work may have an important bearing on the location and prospecting of chrysotile asbestos.

It is now possible to split up tentatively the Older Granite into convenient divisions, and to recognize the existence of an extensive microgranediorite—diorite—gabbro suite. Much interesting light has been thrown on the distribution of the representative of the Karroo System in Swaziland, which seems to be greatly disturbed by strike faulting. This knowledge will be of the utmost value when the time comes to initiate diamond drilling exploration of the coal seams. Mapping is at present in progress in the Mbabane, Manzini and Hlatikulu districts.

REVIEWS

Installation and Extension of a Gate Belt Conveyor

The Recruitment and Training Branch of the National Coal Board has just published Training Manual No. 3, entitled "The Installation and Extension of a Gate Belt Conveyor." It is designed for the use of all workmen who are being trained in the work of installing and attending gate belt conveyors, and will be of assistance also to junior officials, underground mechanics, apprentices and new entrants to the industry.

This illustrated manual is concerned only with the work of installing, extending and maintaining the conveyor. For simplicity, reference to allied subjects such as dust suppression, fire fighting, lighting at the delivery point, tub-loading and shunting have been omitted. For the same reason, no mention is made of conveying in inclined roadways or of bottom loading gate belt conveyors.

Copies may be obtained by persons engaged in the coal mining industry from the Recruitment and Training Branch, N.C.B., Hobart House, Grosvenor Place, London, S.W.7.

Inspection of Roof-Bolt Installations

Suggestions to assist mine inspectors and mining company safety engineers in determining whether roof-bolting installations are adequate to prevent roof-fall accidents are given in *Information Circular* 7621 just released by the U.S. Bureau of Mines.

Although roof-bolting is practised in more than 450 coal and 50 non-coal mines in the United States, the report states that the experience gained thus far has been insufficient to form the basis for a set of rules applicable under all conditions. For the present, it emphasizes that every mine, and even parts of the same mine where roof conditions vary, must be regarded as a special case.

Among the points empasized is that roof-bolting, no less than conventional mine timbering, must be done in accordance with a definite plan. Failure to adopt a roof-bolting plan, or to adhere closely to it if one had been adopted, is mentioned as a factor in many accidents involving roof-bolted areas which the Bureau has investigated.

Noting that roof-bolting, properly done, has proved to increase not only safety, but also productivity, the circular warns against the conclusion that, with its adoption, many or all of the time-proven rules of good mining practice can be cast aside.

Besides outlining briefly the history of roof bolting, describing the procedures used, and discussing roof falls in bolted areas, the circular contains a section headed Guide for Inspectors, giving suggestions for inspecting roof-bolted areas, including visual and mechanical tests for judging the effectiveness of an installation, and notes that the rule for the removal of conventional timbers also applies to the removal of bolts.

Raw Materials for the Mineral-Wool Industry

By C. H. GORSKI, O. D. WHITE, and M. L. MORELAND

The evaluation of raw materials for mineral-wool is one phase of the U.S. Bureau of Mines' programme for the more effective utilization of U.S. mineral resources and in the following article, which is based on U.S. Bureau of Mines' *Report of Investigation No. 4821*, the authors (who are all members of the Bureau's Staff) present the results of experimental work and test-evaluation on several raw materials as useful components for the production of mineral wool. These investigations are of more than usual interest because the effectiveness of mineral wool as a heat-insulating material has assumed an increasingly important role and it has become a fuel saver in countless applications, both in industry and in the home. (The commercial production of wool from slate waste by Dinorwic Slate Quarries, North Wales, was referred to in *The Mining Journal*, February 10).

The U.S. Industrial Mineral-Wool Institute, in co-operation with the U.S. National Bureau of Standards, has established a set of commercial standards for industrial mineral-wools. These are listed as Commercial Standard CS131-46, Industrial Mineral-Wool Products, All Types—Testing and Reporting, by the U.S. National Bureau of Standards, 1946. In addition, various organizations within the mineral-wool industry frequently use other tests for their own plant control.

In the present work shot content and fibre size are considered the two most important criteria. Shot content may be subdivided into free and attached shot. Free shot are the comparatively large slugs that are separated from the fibre during the blowing process and by handling. Attached shot is the shot embedded in the wool and commonly sold with it.

TEST METHODS

Many methods have been proposed for determining attached-shot content. One of the more common ones is that of the National Bureau of Standards. The wool is screened on a 50-mesh screen until the mineral-wool fibres have been forced through the sieves. The quantity of non-fibrous material retained on the screen is classified as shot. This method is satisfactory except that the fine shot passes through the screen along with the fibre, and the amount of shot obtained is often misleadingly low. A novel method for determining attached-shot content has been developed in the U.S. Bureau of Mines' laboratories. The average fibre size of the wool is determined and then the mineral-wool fibres are pulverized without destroying the shot particles, by a hydraulic pressure of 2,000 lb. per sq. in. The pulverized sample is placed in a small hydraulic classifier, and the velocity of the ascending water column is varied, depending on the average fibre size of the wool, by calibrated surface siphons. The fibres are removed with the overflow, and the shot remains in the classifier.

PREPARATION OF SAMPLES

Mineral-wool samples are prepared by melting rock, slag, or mixtures of rock and slag in a graphite crucible heated by a 3.0 kv.-a. high-frequency, electric-induction furnace. The molten charge is blown with steam at 50 to 60 lb. per sq. in pressure, using a commercial Vee nozzle. Temperatures are read with an optical pyrometer. In making a run, the sample is heated to a predetermined temperature, $\pm 10°$ F., and one of the operators tilts the crucible so that the molten charge pours in a thin stream and is blown into wool by the steam jet. The second operator adjusts the steam flow, times the length of the pouring operation with a stop watch, and measures the temperature of the stream of molten material with an optical pyrometer. The wool is blown into a sheet-metal enclosure. The side opposite the blowing end consists of a sheet-metal screen to permit passage of the uncondensed steam to the atmosphere and to catch the wool. The wool is removed from the screen and weighed. The floor of the blowing room is swept to obtain the free shot.

Mineral-wool may be made from a wide variety of materials. The four major components of most commercial wools are silica, lime, alumina, and magnesia, although some wools have been reported in which the iron content as FeO ran as high as 30 per cent.

In recent years, iron-blast-furnace slag has become the raw material most frequently used for making mineral-wool. The greater amount of wool produced per ton of feed with slag, instead of rock, increases cupola capacity. The use of slag has increased also to save the fuel required to drive off volatile material from rocks, and because usually there is greater uniformity of composition in slag than in rock. Despite the favoured position of blast-furnace slag, other raw materials, such as calcareous and agrillaceous rock, and lead and copper slags, are still used. The choice of the raw materials is dictated mainly by availability. In certain cases it is still advantageous to use rock in preference to slag. Because of its light and fluffy nature, shipment of mineral-wool for great distances is not economical.

BLOWING TESTS

During the past five years, many samples of rock and slag have been tested at the Mississippi Valley Experiment Station, Rolla, Mo., to determine their suitability for mineral-wool blowing. In order to compare the mineral-wool prepared in the laboratory with commercial mineral-wool four samples of mineral wool were purchased from commercial sources, and tests were run to determine their average fibre sizes and shot contents. Samples A and B were from a prominent eastern manufacturer, sample C was from the Midwest, and sample D was produced on the Pacific coast. The results of the tests are outlined in the table below:

Sample	*Average fibre size, microns*	*Resin binder, per cent*	*Attached shot, per cent*	*Total fibres, per cent*
A	6.7	1.2	46.8	52.0
B	9.6	3.6	37.2	59.2
C	7.2	2.8	57.3	39.9
D	8.5	1.3	49.9	48.8

A description of a representative group of samples tested, and the results of the tests are given in the following subsections:

Florida Low-Grade, Pebble-Phosphate Slimes.—In the mining and processing of the pebble-phosphates in Florida, considerable waste slime material is accumulated. It is estimated that about 12,000 tons of slime is produced daily and settled in ponds. A sample of this slime, a sample of limestone from Ocala, Fla., and a sample of dolomite from Sarasota, Fla., were submitted to determine whether a blend of the slime with the other materials could be used for making mineral wool. Preliminary tests to determine whether the slime could be used for making mineral-wool without the addition of lime or dolomite showed that a homogeneous fusion could not be made at the usual mineral-wool blowing temperatures (2,300° F. to 2,800° F.).

The best mineral-wool, with respect to fibre size and shot content, was made from a mixture of 72.7 per cent slime and 27.3 per cent dolomite. In a typical test, a batch of this mixture was poured at 2,440° F. at the rate of 0.79 lb. per minute and was blown with steam at 80 lb. per sq. in. gauge pressure. A wool containing 45.4 per cent fibres, with an average fibre diameter of 9.8 microns was obtained. The wool was of approximately the same fibre content as samples C and D, although its average fibre diameter was somewhat larger. During the heating of the batches and blowing of the wool, copious fumes of undetermined composition were evolved.

Rock and Slag from Columbia Rock Wool Sales.—Eight samples of rock and slag were submitted for mineral-wool blowing tests. Six of these were samples of rock taken from two rooms in their mine and were designated A-1, A-2, A-3, B-1, B-2 and B-3. In addition, a sample of iron slag from Granite City, Ill., and a sample of slag from Siglo, Tenn., identified as phosphorous slag, were sent. This does not imply that the slag was suitable as a fertilizer product, but the term "phosphorous" was used so as to distinguish between the Siglo, Tenn., slag and the Granite City, Ill., slag. The sponsoring company had been making wool from equal parts of A-1, A-2 and A-3 and from equal parts of B-1, B-2 and B-3, but found that the wool lacked fibre. They had also used a charge containing 325 lb. of Granite City slag and 425 lb. of rock from room B containing equal parts of B-1, B-2 and B-3, but stated that their volume of production was not as great as it should be.

Thirty-one mineral-wool blowing tests were made, using 11 different combinations of rock, rock and slag, and 100 per cent slag. The wool-blowing procedure was the same as used previously. The wool was blown with a commercial 30° Vee nozzle; the stream fall between crucible and nozzle was 5 in., and the impact distance was ¼ in.

Satisfactory mineral-wool was made with all of the rocks, slags, and mixtures of rock and slag tested. The best wools, with regard to both fibre size and shot, were made from mixtures of rock and slag and from Granite City slag. However, the pouring temperature had to be controlled very closely at all times, for in several cases a change of 100° F. in pouring temperature made a considerable difference in fibre size and shot content.

Copper Slag and Rocks from Carney-Pacific Rockwool Co.—The Carney-Pacific Rockwool Co., Longview, Wash., manufactures a black wool using a charge of the following composition (in lb.): Copper slag 800; basalt 100; and lime rock 100. At times, the composition is varied as follows (in lb.): Copper slag 800; basalt 100; lime rock 75; and gravel 25.

Samples of each of these constituents were shipped to the Rolla, Mo. laboratory for mineral-wool blowing tests. A total of 17 mineral-wool blowing tests was made on seven different combinations of the samples. The treatment in the tests was the same used in previous runs. Dense white fumes, which had a garlicky odour, were evolved when charges containing copper slag were fused. These fumes made it difficult to obtain an accurate temperature of the fusion in the crucible and were exhausted to the atmosphere during the heat-up period.

The best wool with regard to shot content was made by fusing 100 per cent copper slag and pouring at 2,250° F. at the rate of 1.03 lb. per minute. The wool was blown with steam at 50 lb. per sq. in. gauge pressure. The finished wool contained 65.5 per cent fibres and 34.5 per cent shot and had an average fibre diameter of 8.5 microns. The shot content and fibre size of this wool was equal to or better than those in any of the commercial samples tested at the Rolla laboratory. None of the mixtures tested gave wools as high in quality as those made with 100 per cent slag.

TESTS WITH GRANITE

During the past several years, two samples of granite were received for mineral-wool blowing tests. One sample was from the Cold Spring Granite Co., Coal Spring, Minn. This granite was a waste product from other operations and, as such, was crushed and disposed of as railroad ballast, riprap, etc. The other sample was from O. F. Pyle of Dracut, Mass. Samples of limestone and marl, for blending with the granite, were received also.

Blowing tests showed that mixtures of 40 per cent Cold Spring, Minn., granite and 60 per cent marl and 40 per cent Dracut, Mass., granite and 60 per cent limestone gave satisfactory mineral-wools. In one experiment, a mixture of 40 per cent Cold Spring, Minn., granite and 60 per cent marl was fused and blown into wool at 2,620° F. at a rate of pour of 1.13 lb. per minute. Steam was supplied through a 30° Vee nozzle at 50 lb. per sq. in. gauge pressure. The finished wool had an average fibre diameter of 7 microns and consisted of 61.7 per cent fibres and 38.3 per cent shot. It had approximately the same shot content as commercial sample B, but a somewhat lower fibre diameter. In another experiment, the charge consisted of 40 per cent Dracut, Mass., granite and 60 per cent limestone. The charge was heated to 2,650° F. and was poured at the rate of 1.92 lb. per minute. The stream temperature was approximately 100° F. lower than the temperature of the melt in the crucible. Steam was supplied at 50 lb. per sq. in. gauge pressure through a 30° Vee nozzle. The wool produced had an average fibre diameter of 7 microns and contained 62.4 per cent fibre and 37.6 per cent shot. The wool was approximately the same with respect to fibre size and shot content as that produced from the Cold Spring granite.

CONCLUSIONS

A relatively simple method for evaluating raw materials for the preparation of mineral-wool has been developed. This consists of fusing a small sample of charge (several hundred grammes) and blowing it into wool. Then the average fibre diameter and shot content are determined. Satisfactory mineral-wools have been blown from limestones, dolomitic limestones, iron blast-furnace slags, phosphorous slags, slimes from the mining and handling of the Florida pebble-phosphates, and granites. Samples have been tested from every geographical section of the United States.

Australian Experiment to Recover More Coal

Experiments are being carried out at the Aberdare Extended Colliery, Cessnock, N.S.W., for the recovery of millions of tons of pillar and barrier coal from abandoned seams. Called hydraulic stowage, the method employs a suspension of sandy material in water which is piped to the coal face and fed into casings of wood and hessian, in the form of pillars. The water escapes through the hessian and, after drying, the mixture consolidates sufficiently to stand in almost vertical faces.

The New South Wales Government has set up a committee to investigate the method which is said to permit the recovery of pillar coal at a cost of 6s. 4d. per ton. Large scale adoption of the method would require plant to quarry, crush, prepare and transport the filling material as well as equipment to extract the coal.

Machinery & Equipment

New Holman Forging Hammer

The new "DG" Forging Hammer, made by Holman Bros. Ltd., Camborne, Cornwall, is described in a new leaflet issued by the company as a compressed air operated machine, working most satisfactorily at pressures between 70 and 90 lb. per sq. in. It is of particularly robust design and construction and is stated to be capable of producing coal picks, moil points, chisels and all types of light forgings. The machine is supplied with a plain faced pair of swaging dies but other dies can be designed to suit particular requirements.

Leading particulars of this new machine are:

Capacity: Using swaging blocks with a working face of 5¾ in. x 5¾ in. Maximum thickness of material to be forged 2¼ in. Maximum blows per minute 520.

Dimensions: Height to centre of swaging blocks 33¾ in.; overall width 31 in.; overall depth—front to rear 40 in.; overall height 63 in.

Weight: Net with standard swaging blocks 2,600 lb.; net without swaging blocks 2,544 lb.; gross 2,766 lb.

British Standard for Rubber Conveyor and Elevator Belting Revised

The British Standards Institution has just issued a revision of B.S.490, entitled, "Rubber Conveyor and Elevator Belting," which was originally published in 1933 and was revised as a War Emergency edition in 1943. The new document reverts, to a great extent, to the original standard of 1933, but now has five weights of fabric as well as three grades of rubber cover. The standard also gives details regarding the construction of the belting and stipulates limits for defects, tolerance, strength of fabric and adhesion. Methods of test are given in the appendices, where information is also contained regarding suggestions for the selection of belting; the appendices also contain recommendations with regard to service conditions. In view of the present shortage of cotton, an amendment slip is being published simultaneously with the document temporarily relaxing the strength of the fabric by five per cent.

Copies of this standard may be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1. Price 3s. post free.

South African Order for David Brown & Sons

David Brown & Sons (Huddersfield) Ltd. have received, through their South African associates, David Brown & Sons S.A. (Pty.) Ltd., of Johannesburg, an order for a 28 in. Radicon Worm Reducer, largest in the range of these standard units. This reduction gear, which is also the largest of this type to be supplied to South Africa, will provide the drive for the manhoist winder gear serving a 500 ft. colliery shaft.

Approximately 6 ft. high, 5 ft. long, 3 ft. wide, and weighing 4½ tons, this Radicon of 60: 1 ratio will connect a 150 h.p. slip ring motor, with a speed of 735 r.p.m., and a double drum winding spindle operating at 12.25 r.p.m.

Normal unbalanced man-load in the cage will be 12,600 lb. which, at a speed of 300 ft. per min., represents 115 h.p. Moreover, this load will be applied to the reduction gear in both directions of rotation.

One of the essential requirements is that, in the event of emergency, when the brake is suddenly applied before the current has been switched off, the reduction gear unit must be capable of withstanding for short periods the load equal to the maximum torque of the motor, which will be approximately 300 h.p. or more.

The Hunslet Engine Company in 1951

During 1951, both the deliveries effected, and the orders booked, by the Hunslet Engine Co., Ltd., Leeds, were notable for quality and variety as well as for quantity. Principal overseas deliveries were to South Africa, West Africa, Algeria, Rhodesia, Sudan, Tanganyika, India, Pakistan and Borneo.

The company's locomotive output continues to be about 50 per cent steam and 50 per cent Diesel, the latter being of the straight Diesel type with the company's own transmission. The 500 h.p. model tended to overshadow others in a technical sense and during dynamometer car tests on British Railways recorded sustained drawbar pulls of 39,400 lb. at 2¼ to 4 m.p.h.; hauled mineral trains up to 1,047 tons over ruling grades of 1 in 133 and 435-ton trains up 1 in 48-50 and handled through freight trains of 400 to 500 tons weight over distances of 65 to 70 miles.

Other noteworthy Diesel deliveries were several 204 h.p. six-wheelers for local freight and shunting services on the East African Railways and Harbours and for South Africa; a repeat batch of the same output for the Algerian Railways; a 300 h.p. heavy shunter for Rhodesia; some six-wheel 145 h.p. machines for light passenger traffic on the British North Borneo Railway, these being the first traction application of the Gardner 8 LW engine; and many 300, 204 and 153 h.p. industrial shunters for England. Mines type and contractors Diesel locomotives continued in full production for this country and abroad and two new models, of 100 and 45 h.p., were introduced during the year.

Concreting and Related Operations at the Kelley Shaft Butte, Montana

The progress and many unusual features pertaining to the sinking and concreting of the Kelley Shaft—the largest shaft in the Western Hemisphere—at Butte, Montana, were referred to in a paper on "Concreting and Related Operations at the Kelley Shaft, Butte, Montana," presented at the American Mining Congress, Los Angeles, by Messrs. A. R. Sims (Asst, Gen. Supt. of Mines, Anaconda Copper Mining Co., Butte, Mon.) and Lester Bishop (Res. Eng., Anaconda Copper Mining Co.).

The authors point out that 14 cu. yd. of rock were removed per linear foot of shaft, the minimum out-side dimensions being 38 ft. x 9 ft. To date, each linear foot of shaft has required 8 cu. yd. of concrete. Side and end walls walls are poured to ground, with a minimum thickness of 16 in.

Mechanical mucking, using a clamshell bucket, and a special arrangement of air operated Gardner-Denver HMK hoists, was successfully accomplished, even when timber was required as close as 5 ft. from the shaft bottom.

The demountable steel forms used for concreting, the fabricating of the reinforcing steel into units that were easily handled on the deck of the sinking cage, the specially designed guide supports used in the shaft, and the technique employed in pouring the concrete are all fully illustrated and explained in the paper.

Strange as it may seem, concrete poured into a vertical pipe line that has an open end discharge, attains its maximum velocity of approximately 70 ft. per second in the first 200 ft. The observed time for concrete to travel down 2,860 ft. of vertical pipe was 40 seconds.

Two 2 compartment shaft raises have been driven from levels of adjoining mines. One of these is 730 ft. high, the other 146 ft. high. Both holed perfectly. A third raise, the full size of the shaft is now being driven. It is up 250 ft., and will hole at 669 ft. A fourth shaft raise is contemplated, which will be 573 ft. high. Pressure grouting and shaft drainage are also discussed in this paper.

Company News & Views

Rand Dividend Season Closes

With the declaration of the half-yearly dividends from the operating companies in the Anglo American Corporation group, the December Rand dividend season closed. Brakpan and South African Land ("Sallies") in this group distributed more than in June last while the two dividend payers in the General Mining group maintained payment at the June levels.

The half-yearly dividends declared by the operating companies in the Central Mining Rand Mines group were in general lower than those distributed either in June last or a year ago, but Blyvooruitzicht and East Rand Proprietary paid the same as for the three preceding half-years.

East Champ d'Or and New State Areas in the Johnnies group distributed the same as in June while Government Areas and Randfontein paid less. The passing of the dividend by Wit Gold was not unexpected as the Company recently proposed the repayment of 1s. 6d. per share.

The Union Corporation's group dividends contained two increases compared with the June payments, Geduld and East Geduld paying more. The other two dividend payers in the group, Grootvlei and Marievale, maintained payments at the June level.

All in all the December dividend declarations were better than expected. Although several companies distributed less they were, in general, older mines whose profit margins have been hard squeezed by the rising costs and the decline in the premium gold sales price. On the other hand, despite these adverse features four companies out of the thirty-seven operating companies in the big mining groups were able to distribute more than they did six months ago and no less than twenty-one companies have maintained payments at the same level as in June last.

December dividend payments from the Consolidated Goldfields group and the Anglo Transvaal group were given in our issue of December 14 in these columns.

Anglo American Corporation	*June* 1950	*Dec.* 1950	*June* 1951	*Dec.* 1951
	s. d.	s. d.	s. d.	s. d.
Brakpan	1 0	1 1½	1 0	1 1½
Dagga	3 3	3 3	3 0	3 0
E. Dagga	1 9	1 9	1 4½	1 4½
S.A. Land	1 4½	1 7½	2 0	2 3
Springs	6	7½	4½	4½
W. Reefs	1 3	1 3	1 3	1 3
Central Mining				
Blyvoor	1 4	1 4	1 4	1 4
City Deep	3 6	3 6	3 0	2 6
Cons. Main Ref.	4 6	4 0	3 6	3 6
Crown	5 6	6 6	5 6	4 6
Durban Deep	2 9	3 0	2 6	2 6
E. Rand Prop.	2 6	2 6	2 6	2 6
Modder. East	4 6	4 0	3 0	2 6
Rose Deep	3 6	3 6	2 9	2 6
Rand Mines	3 6	3 6	3 6	3 6
Trans. Gold	1 0	1 0	1 0	3
General Mining				
S. Roodepoort	9	9	9	9
W. Rand Consol.	1 3	1 6	1 6	1 6
Johnnies				
E. Champ d'Or	4½	4½	4½	4½
Govt. Areas	1 3	1 4½	1 1½	1 0
N. State Areas	9	7½	7½	7½
Randfontein	1 6	1 6	1 3	1 0
Wit. Gold	1 0	1 6	1 6	Nil
Union Corporation				
E. Geduld	2 3	2 4½	2 1	2 3
Geduld	8 0	8 6	7 3	7 6
Grootvlei	1 4½	1 7½	1 6	1 6
Marievale	10	1 0	1 0	1 0

Géomines Turns to Lode Mining

Tin miners familiar with the problem of replacing depleted ore reserves in Malaya, will have read with interest the directors' report of the Compagnie Géologique et Minière des Ingenieurs et Industriels Belges (Géomines) published in our issue of December 14. This company, which in recent years has been responsible for producing between a quarter and a third of the Congo's total tin output has been facing the gradual exhaustion of its alluvial deposits, which in the past 20 years have yielded some 70,000 tonnes. In 1946 the Company began prospecting its lode deposits with good results. The hard pegmatites were found to be well mineralized, and have proved to constitute important new ore reserves. However, as the chairman (Monsieur L. Greiner) pointed out in his address to shareholders at the recent annual meeting, new equipment was necessary both for mining and for the reduction to a 2 mm. mesh and washing of the new ores.

A mining programme was prepared and the first stage, planned to give a mine output of 150 cu. m. of mine ore per hour, was put in hand. In the initial stages certain difficulties were encountered due partly to the carbon steel used in the drill bits not being hard enough and partly to the drills themselves being underpowered. These twin problems were eventually resolved by the substitution of nickel steel and the ordering of more powerful drills. The less powerful drills will however be able to be fully used once sufficient supplies of nickel steel are available, although owing to the Korean war about a year's delay was experienced in getting the new equipment.

According to the Chairman, the Company now expects to have the first stage of the new programme operating on a commercial scale from the beginning of next year, while the equipment required to achieve the second stage of the programme—providing for an hourly milling rate of 300 cu. m.—is already at Monono and should be in operation by the middle of 1953. Further equipment is also on order to raise the throughput to 500 cu. m. by 1954 which should make possible a tin-ore production of around 5,000 tonnes per annum in addition to the Company's declining alluvial production.

Company Shorts

Middlevlei's Improved Dividend Income.—Gross revenue of Middlevlei Estate and Gold Mining for the year to June 30 at £26,080 compares with the previous year's earnings of £7,340. The improved position was due to dividend income which advanced from £6,600 to £11,505 and to the receipt of £13,670 in respect of interest received on New Union Goldfields claim account. Net profit was £23,441 against £4,603 previously. To this was added a tax credit of £750 and £4,901 brought in making £29,092 available. There was an appropriation of £4,558 to cover the net loss on realization of investments which left the carry forward at £24,534 (£4,901).

African Investment Trust Strengthens Its Reserves.—African Investment Trust have recommended the payment of five per cent (same) for the year to June 30, 1951. The preliminary statement announcing this distribution also reported that net profit was higher at £16,217 (£9,715) which figure was struck after paying taxation charges more than double those of the previous year—£9,818 against £4,819. The dividend payment required £7,875. General reserve was strengthened by the allocation of £8,000 compared with £2,000 previously and the carry forward was left slightly higher at £13,925 against £13,583.

The dividend is payable on February 28. The annual meeting will be held on January 9, 1952. Sir Joseph Ball is chairman.

CAPITAL REQUIRED. To explore four new Mining Concessions bearing Pyrites, Gold, Silver and Manganese deposits. For further particulars please apply to Box 514, c/o. The Mining Journal, 15, George Street, London, E.C.4.

KLERKSDORP CONSOLIDATED GOLDFIELDS

MACKENZIE SECTION DEVELOPMENTS

The Annual General Meeting of Klerksdorp Consolidated Goldfields, Ltd., was held on December 20 in London, **Mr. W. M. Kirkpatrick** (Chairman) presiding.

The following are extracts from the Chairman's circulated statement:

In December last I outlined the basis upon which the Board had decided to proceed with the exploitation of the company's mining interests. Unhappily, the general world situation and, in particular, the conditions ruling in the gold mining industry have been unpropitious during the whole of this year and it has, therefore, not been possible to make progress with the ideas indicated in my last statement.

The Dominion Reefs (Klerksdorp), Ltd., in which we have a substantial holding, had a very difficult year to June 30 last, because of a decline in the grade of ore mined, with the result that for the second year that company has not paid a dividend. In fact, it made a slight loss during the year ended June 30 last. I am happy, however, to be able to tell you that developments which have taken place on that company's properties during the past months have been most encouraging as will be seen from the following paragraphs extracted from the statement to the shareholders of that company.

"The development in the Mackenzie Section calls for special mention. This is the first major discovery of economic importance which has been made on the mine for a number of years.

"You will recall that last year I mentioned that a west crosscut on No. 15 level had been commenced to explore the ground beyond the major upthrow fault. At that time it had reached a length of 529 ft. This crosscut was continued and intersected reef carrying payable values at a distance of 1,185 ft.

"Altogether a total of 1,260 ft. of development on reef in this area was sampled, of which 55.0 per cent averaged 6.99 dwt. Development has so far been confined to the lower reef horizon.

ENCOURAGING RESULTS

"The area west of the fault lies a considerable distance from any other workings and virtually constitutes a new section of the mine. The present work is the first to be done in the area and so far as is known there is no geological feature which would limit the extent of the reef. As is usual in this type of mine values vary from point to point but the average over the whole length, 910 ft., is above our reserve grade and these results must be considered most encouraging.

"For the four months following the year under review development was confined almost wholly to the Mackenzie Section west of the upthrow fault. A total of 1,435 ft. was developed on reef and sampled, of which the following are the main features.

"On No. 15 level the north drive was advanced a further 120 ft., of which 55 ft. averaged 7.61 dwt. The south drive was advanced a further 465 ft., of which 85 ft. averaged 5.84 dwt. Raise 4,226 ft. south was advanced a further 150 ft. in low values and raise 4,714 ft. south was advanced a further 75 ft., of which 40 ft. averaged 6.05 dwt. Raise 5,184 ft. south was started and advanced 110 ft., of which 15 ft. averaged 2.87 dwt.

"Winze 4,535 ft. south was started and advanced 35 ft., of which 30 ft. averaged 9.02 dwt. Winze 3,922 ft. south was started and advanced 25 ft., averaging 21.26 dwt. Raise 4,533 ft. south was started and advanced 55 ft., averaging 27.92 dwt.

"On No. 14 level a north drive was commenced off raise 4,714 ft. south and advanced 200 ft., of which 175 ft. averaged 30.44 dwt. A south drive was started and advanced 175 ft., of which 120 ft. averaged 11.33 dwt.

"This work continues to show the promise of the earlier work in the new area."

In conclusion, I would assure shareholders that the original purpose of the Board to turn our mining interests to good account has not in any sense been abandoned. We all hope that the forces which are at work to restore sane economic principles will yet meet with good success, with the consequence that gold, which has been the "Cinderella" of industry, will be elevated to its rightful place and given a true economic value in terms of an increased gold price.

The report was adopted.

W. E. SINCLAIR, M.I.M.M.
Consulting Mining Engineer
South & East Africa & Rhodesia
P.O. Box 1183. JOHANNESBURG

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LTD.

(Incorporated in the Union of South Africa)

NOTICE TO STOCKHOLDERS
SIX PER CENT CUMULATIVE PREFERRED STOCK
DIVIDEND No. 45

NOTICE IS HEREBY GIVEN that DIVIDEND No. 45 of 3 per cent for the half-year ending 31st December, 1951, being at the rate of 6 per cent per annum, has been declared payable to stockholders registered in the books of the Corporation at the close of business on the 31st December, 1951, and to persons presenting Coupon No. 45 from Stock Warrants to Bearer.

The Dividend is declared in the currency of the Union of South Africa and becomes due on the 2nd January, 1952. Warrants will be posted from the Head and London Offices on or about the 6th February, 1952.

The Dividend is payable subject to the usual conditions which can be inspected at the Head and London Offices of the Corporation.

The Transfer Books and Register of Members will be closed from the 1st to 9th January, 1952, both days inclusive.

Holders of Stock Warrants to Bearer are notified that the Dividend is payable at Barclays Bank (Dominion, Colonial and Overseas), Circus Place, London Wall, E.C.2, or at the Banque de l'Union Parisienne, 6 and 8, Boulevard Haussmann, Paris, on or about the 7th February, 1952. Coupons must be left four clear days for examination.

The effective rate of Non-Resident Shareholders' Tax is 6.9 per cent.

London Office:
11, Old Jewry, E.C.2.
21st December, 1951.

By Order of the Board,
W. E. GROVES,
London Secretary.

ANGLO AMERICAN CORPORATION GROUP OF COMPANIES

DECLARATION OF DIVIDENDS

NOTICE IS HEREBY GIVEN that dividends have been declared payable to shareholders registered in the books of the undermentioned companies at the close of business on the 31st December, 1951.

The dividends are declared in the currency of the Union of South Africa and become due on the 2nd January, 1952. Warrants will be posted from the Head and London Offices on or about the 6th February, 1952.

The dividends are payable subject to the usual conditions, which can be inspected at the Head and London Offices of the Companies.

The Transfer Books and Register of Members will be closed in each case from the 1st January, 1952, to 9th January, 1952, both days inclusive.

Holders of Share Warrants to Bearer are notified that the dividends are payable at Barclays Bank (Dominion, Colonial and Overseas), Circus Place, London Wall, E.C.2, or at the Banque de l'Union Parisienne, 6 and 8, Boulevard Haussmann, Paris, on or about the 7th February, 1952, the respective coupons being as set out in the following tabulation. Coupons must be left four clear days for examination.

Name of Company (Each of which is incorporated in the Union of South Africa)	Dividend No.	Share Warrant Coupon No.	Rate of Dividend per share in Union of South Africa Currency
			s. d.
Brakpan Mines Ltd.	78	78	1 1½
Daggafontein Mines Ltd....	38	38	3 0
E. Daggafontein Mines Ltd.	24	—	1 4½
The South African Land & Exploration Co. Ltd. ...	27	27	2 3
Springs Mines Ltd.	60	60	4½
Western Reefs Exploration & Development Co. Ltd.	21	—	1 3

NOTES

(*a*) The effective rate of the Non-Resident Shareholders' Tax for all the above Companies is 7½ per cent.

(*b*) So as to comply with Stock Exchange requirements, which necessitate the announcement of Annual Net Profit figures of Companies (other than mining companies) at the same time as the declaration of final dividends, the Board of The New Era Consolidated Ltd. and, as in previous years, the Boards of Anglo American Investment Trust Ltd. and the West Rand Investment Trust Ltd., will consider the declaration of final dividends for the year to 31st December, 1951, early in 1952, when those Companies' Net Profits for 1951 have been ascertained.

By Order of the Boards,
ANGLO AMERICAN CORPORATION OF SOUTH AFRICA LTD.
London Office:
11, Old Jewry, E.C.2.
21st December, 1951.

W. E. GROVES,
London Secretary.

HUNSLET-WICKHAM MAN-RIDING CARS

FOR LOCOMOTIVE OR ROPE HAULAGE

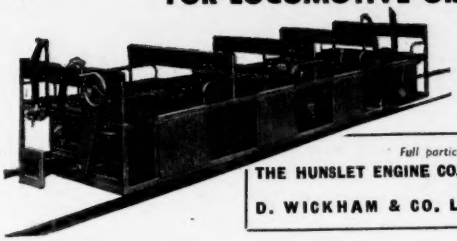
CAPACITY
24 men

STRENGTH
All steel.

EASY RIDING
Semi-elliptic springs.
Fixed axles.
Roller bearing wheels for easy running round curves.

SAFETY
Passengers inside car.
Westinghouse brakes and hand screw brake.

ECONOMY
Low tare weight giving max. pay load.



TARE WEIGHT (complete with Westinghouse air-brake gear and hand screw brake)
17½ cwt. (1,960 lb.)

Full particulars from :
THE HUNSLET ENGINE CO. LTD., JACK LANE, LEEDS, ENG.
or
D. WICKHAM & CO. LTD., WARE, HERTS., ENG.

RUBBER LININGS
FOR ACID RESISTANCE

•

ALL TYPES OF TANKS LINED ON SITE WITH NORDAC ACID RESISTING RUBBER.

•

RUBBER LINED PIPE INSTALLATIONS SUPPLIED COMPLETE WITH VALVES, PUMPS AND FITTINGS.

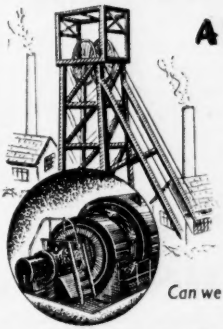
•

NORDAC LIMITED
CHEMICAL ENGINEERS

COWLEY MILL ROAD, UXBRIDGE, MIDDLESEX.

Telephone : UXBRIDGE 5131

Wherever there's Mining machinery CLEANING RAGS ARE VITAL.



We supply Washed and Graded Cleaning and Polishing Rags, Cotton Waste, Stockinette, etc., for all types of machinery and allied purposes.

Can we quote for your requirements ?

E. AUSTIN & SONS (LONDON) LTD.
ATLAS WHARF · HACKNEY WICK · LONDON, E.9

Telephone: AMHerst 2211

WILFLEY

JAW CRUSHERS
BALL MILLS
CONCENTRATING TABLES
CENTRIFUGAL SANDS PUMPS
MACE SMELTING FURNACES · MACE SINTERING HEARTHS

THE WILFLEY MINING MACHINERY CO. LTD. Salisbury House, London, E.C.2
TELEPHONE MANSION HOUSE 1674 TELEGRAMS "WRATHLESS, LONDON"

Metal and Mineral Trades

THE BRITISH METAL CORPORATION LIMITED.

HEAD OFFICE
PRINCES HOUSE, 93 GRESHAM STREET, LONDON, E.C.2
Tel. Monarch 8055

AND AT

17 SUMMER ROW, BIRMINGHAM
Tel. Central 6441

47 WIND STREET, SWANSEA
Tel. Swansea 3166

OVERSEAS ASSOCIATES

THE BRITISH METAL CORPORATION (AUSTRALIA) PTY., LIMITED SYDNEY, PERTH AND MELBOURNE

THE BRITISH METAL CORPORATION (CANADA) LIMITED MONTREAL AND TORONTO

DREW, BROWN LIMITED MONTREAL AND TORONTO

THE BRITISH METAL CORPORATION (INDIA) LIMITED, CALCUTTA AND BOMBAY

THE BRITISH METAL CORPORATION (PAKISTAN) LIMITED KARACHI

THE BRITISH METAL CORPORATION (SOUTH AFRICA) (PROPRIETARY) LTD. JOHANNESBURG

C. TENNANT, SONS AND CO., OF NEW YORK, NEW YORK

CONSOLIDATED TIN SMELTERS, LIMITED.

ST. SWITHIN'S HOUSE, 11/12 ST. SWITHIN'S LANE, LONDON, E.C.4

Telephone: MANsion House 2164/7 *Telegrams: CONSMELTER, PHONE LONDON*

PROPRIETORS OF THE FOLLOWING BRANDS OF LAMB & FLAG AND STRAITS TIN

ENGLISH (COMMON & REFINED) CORNISH MELLANEAR PENPOLL

STRAITS E. S. COY., LTD., PENANG

BUYERS OF ALL CLASSES OF TIN ORES

Sole Selling Agents: VIVIAN, YOUNGER & BOND, LIMITED

8 BASINGHALL STREET, LONDON, E.C.2 *Telephone:* MONarch 7221/7

Established 1797 *Members of the London Metal Exchange*

DERBY & Co., Ltd.

Specialists in WOLFRAM, SCHEELITE, CHROME, MOLYBDENITE, TANTALITE, COLUMBITE, RUTILE, ILMENITE, BERYL, ZIRCON AND OTHER MINERALS.

Smelters and Refiners of GOLD, SILVER, PLATINUM, PALLADIUM, OSMIUM, IRIDIUM, ETC.

Buyers of MINERALS, ORES, CONCENTRATES, SWEEPS, LEMELS AND RESIDUES containing GOLD, SILVER, PLATINUM, COPPER, TIN, ZINC, LEAD.

Smelting and Refining Works: BRIMSDOWN, MIDDLESEX

City Office: 11-12 ST. SWITHIN'S LANE, E.C.4
Telephone: AVENUE 5272 (20 lines)

Also at NEW YORK — ADELAIDE — JOHANNESBURG

Cable Address: WAHCHANG, NEW YORK

WAH CHANG CORPORATION

(FORMERLY WAH CHANG TRADING CORPORATION)

233 BROADWAY - - - NEW YORK 7, NEW YORK

TUNGSTEN TIN

BUYERS

Tungsten Concentrates, Tungsten Tin Concentrates
Mixed Tungsten Ores
Tungsten Tailings, Scrap, Tips, Grindings
Tin Concentrates—Tin Dross, Tin Furnace Bottoms

SELLERS

Tungsten Concentrates to Buyers' Specifications
Tungsten Salts, Tungsten Powder
Tungsten Rods and Wires
Tin Ingots, Tin Oxides, Tin Chlorides

PLANT—GLEN COVE, NEW YORK

THE BRITISH TIN SMELTING COMPANY LIMITED

English Refined Tin

"HAWTHORNE" Brand

W. E. MOULSDALE & CO., LTD.
General Agents
2 CHANTREY HOUSE, ECCLESTON STREET, LONDON, S.W.1

THE STRAITS TRADING Co. Ltd.
SINGAPORE

Straits Refined Tin

"Straits Trading Co. Ltd." BRAND

Correspondents in U.K.
W. E. MOULSDALE & CO., LTD.
2 CHANTREY HOUSE, ECCLESTON STREET, LONDON, S.W.1

GEORGE T. HOLLOWAY & CO. LTD.

METALLURGISTS & ASSAYERS,
ORE TESTING, WORKS AND
METALLURGICAL RESEARCH LABORATORIES

Atlas Road, Victoria Road, Acton,
LONDON N.W.10

Telephone No.: ELGAR 5202
Tels. & Cables: NEOLITHIC LONDON

THE ANGLO METAL COMPANY LIMITED

2 & 3, CROSBY SQUARE,
LONDON, E.C.3
(Members of the London Metal Exchange)

NON-FERROUS METALS
ORES & CONCENTRATES
BULLION

Telephone: LONDON WALL 6341 (Private Branch Exchange)
Telegrams: NUCLIFORM PHONE LONDON
Cables: NUCLIFORM, LONDON

Telegrams: "BASSETT, PHONE, LONDON."
Telephone: MANSION HOUSE 4401/3.

BASSETT SMITH & Co. Ltd.
(Incorporating George Smith & Son)

15/18 LIME ST., LONDON, E.C.3

METALS,
ORES (Copper, Zinc, Lead, &c., Complex),
RESIDUES, SKIMMINGS & ASHES
NON-FERROUS SCRAP

A. STRAUSS & CO. LTD.
FOUNDED 1875

PLANTATION HOUSE, MINCING LANE, E.C.3
Telephone: Avenue 5551

MERCHANTS, EXPORTERS, IMPORTERS
NON-FERROUS METALS
SCRAP RESIDUES

METAL REFINERS
Members London Metal Exchange

ESTABLISHED 1869
BLACKWELL'S METALLURGICAL WORKS LTD.
THERMETAL HOUSE, GARSTON, LIVERPOOL 19

MAKERS OF
FERRO ALLOYS, NON-FERROUS ALLOYS
RARE METALS

BUYERS AND CONSUMERS OF
COLUMBITE TANTALITE, TUNGSTEN
MANGANESE and all ORES.

Works, Garston. Telegrams: Blackwell, Liverpool

EVERITT & Co. Ld.
40 CHAPEL STREET
LIVERPOOL
Teleg. Address: Persistent, Liverpool
Phone: 2995 Central

SPECIALITY

MANGANESE PEROXIDE ORES,

We are buyers of:—
WOLFRAM, SCHEELITE, MOLYBDENITE
VANADIUM, ILMENITE, RUTILE,
ZIRCONIUM and TANTALITE ORES

Suppliers of:—
FERRO-ALLOYS & METALS NON-FERROUS ALLOYS

THE ANGLO CHEMICAL & ORE COMPANY LIMITED
PALMERSTON HOUSE, BISHOPSGATE, LONDON, E.C.2

Importers and Exporters MINERALS · ORES · RESIDUES · CHEMICALS · NON-FERROUS METALS & SCRAP

TELEPHONE: LONDON WALL 7255 (5 lines)
TELEGRAMS: CHEMORE

METAL SUPPLIES Ltd

SUPPLIERS OF
BRASS RODS
BRASS SHEETS
NICKEL CHROME IRON WIRES
ZINC SHEETS
CADMIUM
AND ALL OTHER NON-FERROUS METALS

72 VICTORIA ST. LONDON S.W.1

'Phone: VICTORIA 1735 (3 lines). 'Grams: METASUPS, WESPHONE.

Consult
JOHN DALE
LIMITED
about Aluminium Alloy Gravity Die Castings
DEPT. TS.7., LONDON COLNEY, ST. ALBANS, HERTS.
Telephone: Bowmansgreen 2266

Gordon Simpson (Assayer) Ltd.
Consulting, analytical Chemists; assayers, samplers, etc.
191 CLAPHAM ROAD, LONDON, S.W.9
Telephone: BRixton 1671

ALFRED HARRIS & Co. (Richmond) Ltd.
FOR ALL SCRAP METALS
Specialities:—
NICKEL MOLYBDENUM TUNGSTEN
MANOR PARK, RICHMOND, SURREY *Phone: 0028/9*

RHONDDA METAL CO. LTD.
1 HAY HILL, BERKELEY SQ. LONDON, W.1
Works: PORTH, GLAM.
PHOSPHOR COPPER
PHOSPHOR BRONZE, LEAD BRONZE, GUNMETAL, BRASS
Telephone: MAYFAIR 4654 Cables: RONDAMET

LEOPOLD LAZARUS LIMITED
Creechurch House, LONDON, E.C.3
(Also at BIRMINGHAM, MANCHESTER and SWANSEA)
Telegraphic Address: Orminiaz, London
Buyers of:
NON-FERROUS SCRAP, ORES AND RESIDUES
Sellers of:
SEMI-MANUFACTURED NON-FERROUS METALS

CUPELS
MAGNESIA CUPELS and ASSAY MATERIAL "MABOR" BRAND, as supplied to MINTS, MINES and ASSAYERS throughout the World.
MABOR (1944) LIMITED
(Founded 1900)
THE PIONEERS OF MAGNESIA CUPELS
Registered Office: 310 Winchester House, London, E.C.2
Phone: London Wall 5089 *Tel. Address.* Maborlim, Lnndon
Agencies: SALEM, INDIA: MONTREAL, CANADA: PERTH, W.A.
Supplies through Agents, the Trade, or direct.

WOLFRAM ORE
TIN ORE
FELIX KRAMARSKY CORPORATION
39 BROADWAY
NEW YORK 6, N.Y.
Cable Address: Orewolfram

METAL TRADERS LTD.
7 GRACECHURCH ST., LONDON, E.C.3
Telegrams: Serolatem, Stock, London
Telephone; MANsion House 7275/6/7
Buyers and Sellers of
NON-FERROUS METALS
ORES AND MINERALS
New York Representative:
Metal Traders Inc., 67 Wall Street

BROOKSIDE METAL CO. LTD.
(Owned by Metal Traders Ltd.)
HONEYPOT LANE, STANMORE, MIDDX.
Telegrams: Aluminium, Stanmore
Telephone: EDGware 1646/7
Buyers and Sellers of
ALL NON-FERROUS METALS
Specialists in ALUMINIUM

Telegrams: NONFERMET TELEX, LONDON
Cables: NONFERMET LONDON
Telephone: MANSION HOUSE 4521 (10 lines)

HENRY GARDNER & CO. LTD.

Non-Ferrous Metals
Ores, Minerals & Residues
Rubber
General Merchandise

2 METAL EXCHANGE BUILDINGS
LONDON, E.C.3
and at BIRMINGHAM, MANCHESTER and GLASGOW

S. J. BARNETT & Co. Ltd.

DERBYSHIRE HOUSE,
BELGROVE STREET, LONDON, W.C.1
Telephone: Terminus 3154

ORES - METALS - RESIDUES

P. & W. MACLELLAN LTD.
129 TRONGATE, GLASGOW

NON-FERROUS METALS all classes
INGOT SCRAP MANUFACTURED

Letters: P.O. Box 95 Glasgow
Telegrams: Maclellan, Glasgow *Telephone:* Bell 3403 (20 lines)

SHEARMAN & CO. LTD.
(Est. over 30 years)
BANK CHAMBERS, TAVISTOCK, DEVON
Telephone: TAVISTOCK 497 Cables: SHEARMAN, TAVISTOCK

U.K. Brokers for several Portuguese Mines and Refineries offering:
CASSITERITE, SCHEELITE, TIN INGOTS
WOLFRAM ORE, LEAD ORE, MERCURY.

Cape Town and Johannesburg Branches offer direct shipments of MANGANESE, IRON, CHROME, VERMICULITE, ASBESTOS, ANDALUSITE, MICA, now shipping to all destinations.
ENQUIRIES SOLICITED

ESSEX METALLURGICAL
(F. L. Jameson, A.M.I.M.M.)

Assayers and Samplers

Laboratories and Offices:
13 Woodhouse Grove, London, E.12
Telephone: GRAngewood 4364
Grams: Assaycury, Forgate, London Cables: Assaycury, London

MINING & CHEMICAL PRODUCTS, LTD.
MANFIELD HOUSE, 376, STRAND, W.C.2
Telephone: Temple Bar 6511/3 Works: ALPERTON,
Telegrams: "MINCHEPRO, LONDON" WEMBLEY, MIDDLESEX
Buyers of Silver Ores and Concentrates

Smelters and Refiners of
BISMUTH
ORES, RESIDUES & METAL

Manufacturers of:
FUSIBLE ALLOYS, SOLDER, WHITE METALS
ANODES OF TIN, CADMIUM and ZINC IN ALL SHAPES

Importers and Distributors of:
ARSENIC · BISMUTH · CADMIUM
CAESIUM SALTS INDIUM · SELENIUM
TELLURIUM · THALLIUM

COMPLEX
& LOW GRADE
MATERIALS*
are treated on
toll or bought
outright by

Capper Pass

* containing principally TIN and/or LEAD whether free from or combined with any of the metals COPPER, ANTIMONY, BISMUTH and SILVER

Send Samples to us at
BRISTOL, ENGLAND

RAILWAY MINE & PLANTATION EQUIPMENT LTD.

IMPERIAL HOUSE · DOMINION STREET · LONDON E.C.2.

Telephone: CLErkenwell 1777 (8lines) · Grams: Minplan Ave. London. · Cables: Minplan London.

Printed in England for The Mining Journal Ltd. by Samuel Sidders & Son Ltd., 115, Salusbury Road, London, N.W.6. Registered as a Newspaper.